

R E M A R K S

Reconsideration of this application is respectfully requested.

Claims 14-17 were rejected under 35 USC 103 as being obvious in view of the combination of USP 6,005,506 ("Bazarjani et al") and USP 6,389,059 ("Smith et al").¹ This rejection, however, is respectfully traversed.

On pages 2 and 3 of the Final Office Action, the Examiner acknowledges that Bazarjani et al does not disclose an oscillation unit which includes a frequency determining section which determines a frequency f_0 in accordance with an equation:

$$(|f_1 \pm f_i|/p_1) = \dots = (|f_n \pm f_i|/p_n) = f_0$$

where p_1, \dots, p_n are positive integers and n is an integer equal to or greater than 2, wherein the equation defines a relationship between the respective frequencies f_1, \dots, f_n of the arbitrary radio wave signals receivable by the radio wave reception unit and an intermediate frequency f_i , and wherein the oscillation unit outputs a signal having the frequency f_0 , as recited in independent claim 14. The Examiner also acknowledges that Bazarjani et al does not disclose a multiplying unit which

¹The Examiner does not mention Smith et al in the grounds for rejection set forth at the beginning of item 2 on page 2 of the Office Action; however, Smith et al is relied upon in the body of the rejection.

multiplies the signal having the frequency f_0 output from the oscillation unit, as recited in independent claim 14.

On pages 4 and 6-7 of the Final Office Action, the Examiner acknowledges that Bazarjani et al does not disclose an oscillation unit which outputs a signal having a frequency f_0 which is obtained from an equation:

$$(|f_1 \pm f_i|/p_1) = \dots = (|f_n \pm f_i|/p_n) = f_0$$

where p_1, \dots, p_n are positive integers and n is an integer equal to or greater than 2, and wherein the equation defines a relationship between the respective frequencies f_1, \dots, f_n of the arbitrary radio waves receivable by the radio wave reception unit and an intermediate frequency f_i , as recited in independent claims 16 and 17.

The Examiner asserts that Smith et al contains the missing teachings of Bazarjani et al, and the Examiner asserts that it would have been obvious to modify Bazarjani et al in view of Smith et al to achieve the structure recited in each of independent claims 14, 16 and 17.

It is respectfully submitted, however, that Smith et al merely discloses a system which calculates the frequency of the local oscillation signal by obtaining an average of frequencies of the two input signals.

It is respectfully submitted that, in contrast to the claimed present invention, the system of Smith et al cannot

receive signals having three or more frequencies, and cannot fix the frequency f_0 of the local oscillation signal and the intermediate frequency f_i .

By contrast, with the structure recited in each of independent claims 14, 16, and 17, by using the determined fixed frequencies f_0 and f_i , the radio wave reception device can receive the signals of two, three or more frequencies.

For example, assume that the radio wave reception unit receives two signals having frequencies f_1 and f_2 . In this case, as described in the specification at, for example, page 24 line 9 to page 26 line 3, the local oscillation frequency f_0 is determined so that equation (2) is satisfied.

$$f_i = |f_1 \pm nf_0| \text{ or } f_i = |f_2 \pm mf_0| = f_0 \quad \dots(2)$$

Equation (2) can be expressed by equations (3) to (6).

$$f_0 = (f_1 - f_2) / \{-(m + n)\} \quad \dots(3)$$

$$f_0 = (f_1 + f_2) / (m - n) \quad \dots(4)$$

$$f_0 = (f_1 - f_2) / \{-(m - n)\} \quad \dots(5)$$

$$f_0 = (f_1 + f_2) / (m + n) \quad \dots(6)$$

Assume $f_1=40$ kHz and $f_2=60$ kHz.

When $n=1$ and $m=2$, $f_0=6.666$ kHz according to equation (3), $f_0=100$ kHz according to equation (4), $f_0=20$ kHz according to equation (5), and $f_0=33.333$ kHz according to equation (6).

By setting the local oscillation frequency f_0 at one of the determined frequencies, a fixed intermediate frequency f_i is

outputted when signals having $f_1=40\text{kHz}$ and $f_2=60\text{kHz}$ are supplied to frequency conversion circuit 4.

Next, assume the radio wave receiving unit receives three signals having frequencies f_1 , f_2 and f_3 . In this case, as described in the specification at, for example, page 30 line 14 to page 31 line 17, the local oscillation frequency f_0 and the intermediate frequency f_i are determined so that equation (11) is satisfied.

$$(|f_1 \pm f_i|/p_1) = (|f_2 \pm f_i|/p_2) = (|f_3 \pm f_i|/p_3) = f_0 \quad \dots(11)$$

Specifically, when $f_1=40\text{kHz}$, $f_2=60\text{kHz}$ and $f_3=77.5\text{kHz}$ (frequencies of the long wave standard signals including time codes in German), equation (11) is expressed by equation (12)

$$(|40 \pm f_i|/p_1) = (|60 \pm f_i|/p_2) = (|77.5 \pm f_i|/p_3) = f_0 \quad \dots(12)$$

In equation (12), f_i is determined so that p_1 , p_2 and p_3 are positive integers.

For example, if $f_i=22.5\text{kHz}$, equation (12) is expressed by equation (13).

$$(|40 \pm 22.5|/p_1) = (|60 \pm 22.5|/p_2) = (|77.5 \pm 22.5|/p_3) = f_0 \quad \dots(13)$$

Further, symbols in equation (13) are selected so that equation (14) is obtained, for example.

$$(62.5/p_1) = (37.5/p_2) = (100/p_3) = f_0 \quad \dots(14)$$

Thus, if $p_1=5$, $p_2=3$, and $p_3=8$, $f_0=12.5\text{kHz}$.

Therefore, when $f_1=40\text{kHz}$, $f_2=60\text{kHz}$, and $f_3=77.5\text{kHz}$, and the frequency f_0 of the local oscillator signal is fixed at 12.5kHz ,

and a fixed intermediate frequency $f_i=22.5$ can be obtained when:

(i) a signal having frequency f_1 is supplied to the frequency conversion circuit 4, by multiplying the frequency f_0 of the local oscillation signal by 5 (p1); (ii) a signal having frequency f_2 is supplied to the frequency conversion circuit 4, by multiplying the frequency f_0 of local oscillation signal by 3 (p2); and (iii) a signal having frequency f_3 is supplied to the frequency conversion circuit 4, by multiplying the frequency f_0 of local oscillation signal by 8 (p3).

Thus, according to the present invention, radio waves having not only 2 frequencies but also 3 or more frequencies can be received using the fixed local oscillation frequency f_0 and fixed intermediate frequency f_i .

It is respectfully submitted that Smith et al does not disclose, teach or suggest these features of the present invention, and it is respectfully submitted, therefore, that even if Smith et al were combinable with Bazarkamo et al in the manner suggested by the Examiner, the structural features recited in independent claims 14, 16 and 17 still would not be achieved or rendered obvious.

In view of the foregoing, it is respectfully submitted that the present invention as recited in claims 14, 16, and 17 and claim 15 depending from claim 14 clearly patentably distinguish over Bazarjani et al, and Smith et al under 35 USC 103.

RE: NOTICE OF APPEAL

A Notice of Appeal is submitted herewith so as to keep the application pending while the Examiner considers this Response.

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Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned at the telephone number given below for prompt action.

Respectfully submitted,

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